12th; Fort Macon, North Carolina, 12th; Leetsdale, Pennsylvania, 1st; Point Judith, Rhode Island, 13th, 14th; Indianola, Texas, 28th. *Flying northward.*—Edgington, Illinois, 3d, 7th, 8th, 10th, 24th; Yates Centre, Kansas, 25th; Mackinaw City, Michigan, 16th. *Flying eastward.*—Little Rock, Arkansas, 11th, 12th; Fort Scott, Kansas, 4th. *Flying westward.*—Yates Centre, Kansas, 23d.

Cranes flying southward.—Yates Centre, Kansas, 6th; West Leavenworth, Kansas, 1st; Portland, Oregon, 15th.

PRAIRIE AND FOREST FIRES.

Cantonment, Indian Territory.—Prairie fires prevailed in this vicinity from the 22d to the 26th. On the latter date they were very destructive near Red Hills.

Fort Reno, Indian Territory.—Prairie fires occurred here from the 1st to 10th, 12th, 13th, 16th to 20th, 22d to 25th; those occurring on the last mentioned dates caused much damage, especially to the telegraph lines.

Prairie and forest fires also occurred at the following stations: North Platte, Nebraska, 19th, 21st, 23d, 27th to 30th; Dodge City, 26th; Fort Elliot, 24th, 25th; Huron, Dakota, 2d; Fort Meade, Dakota, 1st, 30th; Fort Randall, Dakota, 18th, 19th; Lead Hill, Arkansas, 12th, 17th.

POLAR BANDS.

Lead Hill, Arkansas, 5th, 6th, 11th, 16th, 23d, 26th to 29th.
Los Angeles, California, 1st, 2d, 5th, 6th, 25th.
Archer, Florida, 3d, 12th, 14th, 17th.
Riley, Illinois, 2d, 3d, 30th.
Guttenburg, Iowa, 24th.
Yates Centre, Kansas, 7th, 8th.
Gardiner, Maine, 5th, 15th.
Somerset, Massachusetts, 13th, 27th.
Clear Creek, Nebraska, 4th, 25th, 29th, 30th.
Wauseon, Ohio, 2d, 7th, 29th.
Pittsburg, Pennsylvania, 11th.
Nashville, Tennessee, 5th, 7th, 8th.
Woodstock, Vermont, 15th, 25th.

WATER-SPOUTS.

New Haven, Connecticut.—A water-spout, one hundred feet in height, was seen off Nonauk, Connecticut, on the afternoon of the 12th.

The schooner "Ella A. Warner," at 3 p. m. of November 22d, when in N. 22° 45′, W. 69° 13′, saw two whirlwinds passing from eastward and throwing water twenty feet high.

The s. s. "Neckar," between N. 46° 55′, W. 39° 07′, and N. 45° 07′, W. 45° 32′, on November 27th, passed several water-spouts of considerable dimensions.

ZODIACAL LIGHT.

Little Rock, Arkansas, 1st, 25th to 29th.
Los Angeles, California, 19th, 22d to 25th.
Pensacola, Florida, 1st, 30th.
Humboldt, Iowa, 23d, 26th, 27th, 28th.
Cambridge, Massachusetts, observed, 16th, 17th, 18th, 25th, 27th, 28th; suspected, 30th.
Toledo, Ohio.—26th to 29th.
Fallsington, Pennsylvania, 2d.
Haverford College, Pennsylvania, 5th, 6th, 8th, 12th.
Nashville, Tennessee, 25th.
Palestine, Texas, 1st, 6th, 16th.

DROUGHT.

Bangor, Maine, 3d.—The mills at this place, which have been shut down for several weeks on account of scarcity of water, resumed operations on this date.

Cape Lookout, North Carolina, 27th.—Owing to the continued drought, all of the cisterns in this vicinity have become dry, and scarcity of water exists.

Jacksonville, Florida, 30th.—Rain is much needed in this vicinity for the winter vegetables.

SAND STORMS.

Fort McDowell, Arizona, 12th, 29th.
Maricopa, Arizona, 12th.
San Carlos, Arizona, 1st, 4th, 12th, 29th.
Willcox, Arizona, 29th.
Fort McDermitt, Nevada, 24th.

ERRATA.

In the September, 1883, REVIEW, under "deviations from mean temperature," on page 206, the mean temperature at Dyberry, Wayne county, Pennsylvania, should have been 4° below the normal, and not 4° above the normal as published.

The meteorological summary forwarded by the director of the Indiana Weather Service and published in the September REVIEW under "Notes and extracts," was for September, 1883, and not for September, 1882, as stated.

NOTES AND EXTRACTS.

WEATHER REPORT FOR NOVEMBER, 1883.

Prepared by Prof. F. H. Snow, of the University of Kansas, from observations taken at Lawrence.

Only two Novembers on our sixteen years record have had more sunshine than this. The temperature was above the average. The rainfall and humidity were below the average, but there was an unusual number of morning fogs.

The mild weather of the past three Novembers has been in marked contrast with the severe winter temperature of November, 1880, during the last week of which month a large crop of ice was harvested at Lawrence.

Mean temperature.—42°.77, which is 3°.55 above the November average. The highest temperature was 74°, on the 25th; the lowest was 14°.5, on the 14th, giving a range of 59°.5. Mean temperature at 7 a. m., 36°.57; at 2 p. m., 51°.97; at 9 p. m., 41°.27. The first severe frost of the autumn occurred on the 1st, twelve days later than its average date. There were only four winter days during the month, days whose mean temperature was below the freezing point. There were sixteen such days in November, 1880.

Rainfall.—0.73 inch, which is 1.36 inches below the November average. Rain fell on two days. There were two thunder-showers. The entire rainfall for the eleven months of 1883, now completed, has been 39.88 inches, which is 7.33 inches above the average for the same months in the preceding fifteen years.

Mean Cloudiness.—38.22 per cent. of the sky, the month being 9.38 per cent. clearer than usual. Number of clear days (less than one-third cloudy) eighteen; half clear (from one to two-thirds cloudy) five; cloudy (more than two-thirds) seven. There were six entirely clear days, and only one entirely cloudy. Mean cloudiness at 7 a. m., 47.67 per cent.; at 2 p. m., 37.67 per cent.; at 9 p. m., 29.33 per cent.

Wind.—Southwest, forty-four times; northwest, eighteen times; southeast, ten times; northeast, seven times; south, five times; north, four times; west, once; east, once. The total run of the wind was 12,692 miles, which is six hundred and sixty-two miles above the November average. This gives a mean daily velocity of four hundred and twenty-three miles, and a mean hourly velocity of seventeen and sixty-three hundredths miles. The highest velocity was fifty-eight miles an hour on the 25th.

Barometer.—Mean for the month, 29.147 inches; at 7 a. m., 29.190 inches; at 2 p. m., 29.131 inches; at 9 p. m., 29.120 inches; maximum, 29.799 inches on the 12th; minimum, 28.646 inches on the 25th; monthly range, 1.153 inches.

Relative Humidity.—Mean for month, 63.6; at 7 a. m., 76.5; at 2 p. m., 45.3; at 9 p. m., 69.9; greatest, one hundred on the 8th and 23d; least, thirteen, on the 17th. There were five fogs.

The following table furnishes a comparison with the fifteen preceding Novembers:

November.	Mean temperature.	Maximum temperature.	Minimum temperature.	Winter days.	Rain (inches).	Snow (inches).	Rainy days.	Thunder-storm.	Mean cloudiness.	Humidity.	Number of fogs.	Miles of wind.	Mean barometer.	Maximum barometer.	Minimum barometer.
	°	°	°												
1868	37.99	73.0	17.0	12	3.54	6.0	5	0	51.77	59.8	1	.....	29.201	29.660	28.880
1869	37.39	72.0	23.0	9	1.80	0.0	8	0	62.89	.....	2	.....	29.111	29.447	28.500
1870	44.92	72.0	17.0	2	0.57	0.0	3	0	36.83	57.9	0	.....	29.151	29.605	28.658
1871	35.89	72.5	3.0	13	2.48	5.0	12	1	57.44	72.3	4	.....	29.106	29.546	28.641
1872	33.30	67.0	*1.0	14	0.01	0.0	1	0	44.89	55.8	0	12.202	29.174	29.779	28.650
1873	42.58	78.0	12.0	4	1.24	0.0	2	0	35.00	55.4	0	15.414	29.129	29.540	28.593
1874	38.76	77.5	5.5	12	3.69	14.0	10	0	56.67	72.4	2	16.104	29.164	29.677	29.267
1875	35.55	70.0	2.0	11	0.30	0.0	3	0	52.78	52.1	0	12.282	29.132	29.677	28.582
1876	37.50	72.0	9.0	8	2.00	3.5	5	0	46.11	70.9	0	12.287	29.171	29.814	28.675
1877	39.23	64.0	9.0	5	1.47	0.0	8	1	48.89	73.8	1	9.494	29.169	29.642	28.797
1878	45.87	72.0	22.0	0	1.05	2.0	5	0	42.00	62.6	1	11.198	29.137	29.535	28.635
1879	44.26	76.5	16.0	5	5.15	2.0	6	4	38.33	70.6	3	11.904	29.147	29.756	28.716
1880	31.58	65.5	7.5	16	2.24	2.5	9	0	51.77	74.4	2	11.323	29.295	29.791	28.782
1881	40.40	71.5	11.0	6	2.55	0.0	5	2	45.55	66.9	2	15.502	29.186	29.656	28.599
1882	43.07	80.0	20.0	3	2.08	0.0	7	0	43.11	72.0	0	11.118	29.241	29.549	28.779
1883	42.77	74.0	14.5	4	0.73	0.0	2	2	38.22	63.9	5	12.692	29.147	29.795	28.646
Mean.	39.44	72.3	11.7	8	1.98	2.2	6	1	47.02	67.1	1	12.085	29.166	29.656	28.650

* Below zero.

Abstract of meteorological observations for the month of November, 1883, as reported to the Bureau of Agriculture, &c., of Tennessee, by voluntary observers in co-operation with General W. B. Hazen, Chief Signal Officer, U. S. A.

County.	Station.	Latitude north.	Longitude west of Washington.	Temperature. Mean of 7 a. m.	Mean of 2 p. m.	Mean of 9 p. m.	Average monthly.	Highest.	Date.	Lowest.	Date.	Wind. Prevailing direction.	Greatest force. Scale 0 to 10.	Date.	Number of days— Clear.	Fair.	Cloudy.	Auroras.	Dew.	Fog	Frost.	Lunar halos.	Solar halos.	Hail storms.	Thunder storms.	On which rain fell, including hail, snow, and sleet.	Total rainfall, including hail, snow, and sleet (in inches).	Observers.
		°	°	°	°	°	°	°		°																			
Bedford	Flat Creek	35 30	9 40	44	59	48	50	72	8	16	16	s.	h. 5.		12	6	12				8	2				8	4.99	William Hart.
Blount	Maryville, 960 ft	35 45	7 00	42	58	48	49	76	21	19	16	w.	h. 7.	21	13	9	8				10					5	4.45	W. H. Henry.
Campbell	Careyville	36 00	7 30	40	55	46	47	65	23	14	17	sw.	br.		7	1	22				18	1				8	6.01	D. Hart.
Carroll	McKenzie, 515 ft	36 10	11 30	44	55	49	49	72	9	16	16	nw.	h. 7.	21	17	2	11				10				2	9	2.37	John Brown.
Coffee	Manchester, 1,000 ft.	35 20	9 04	40	60	45	47	74	8	14	16	n.			13	7	10									7	4.07	Wiley Hickerson.
Coffee	Beech Grove, 1,000 ft	35 30	9 06	43	63	47	50	73	23	16	16	e.	br.		17	3	10				13					10	4.37	B. F. Cheatham.
Cumberland	Grassy Cove, 1,200 ft	36 00	8 00	41	54	42	45	68	10	12	16	n.	h. 6.	12	10	3	11				8				1	6	2.88	Nettie M. Stratton.
Crockett	Gadsden	35 45	12 00	46	57	52	52	73	21	20	16	sw.	h. 5.	21	10	11	9		2	8	8	5	5		4	10	3.61	M. T. Moore.
Davidson	Nashville, 507 ft	36 11	9 52				60	75	10	16	16	se.	h.	21	11	11	8					3				14	3.07	L. N. Jesunofsky.
DeKalb	Smithville(n'r), 1200	35 50	8 40	41	56	44	47	71	21	12	16	sw.	h.	9	10	3	17					3				7	5.10	P. C. Bluhm.
Dyer	Dyersburg	36 30	13 00	42	57	47	48	78	9	17	16	s.	br.		12	6	12			2	10	2				8	1.99	L. Hughes.
Gibson	Trenton, 450 feet	36 00	11 58	43	55	47	48	73	21	16	16	sw.	h. 7.	21	12	9	9				11	4			4	11	5.80	A. S. Currey.
Gibson	Milan, 440 ft	35 55	11 46	43	59	47	49	76	8	15	16	s.	h. 6.	21	13	6	11				11	1			2	13	4.45	M. D. L. Jordan, M. D.
Giles	Pulaski, 650 ft	35 15	10 00	44	61	45	49	71	9	17	16															6	4.80	W. T. Mann.
Greene	Greenville, 1,581 ft.	36 10	5 49	42	58	46	48	73	21	19	16	nw.	h.	20	14	5	11			1	13					8	2.10	E. Link.
Hamilton	Chattanooga, 783 ft.	35 04	8 15	45	59	50	51	76	9	17	16	s.	h.	27	10	11	9	1		4	9	2	3			10	6.79	B. L. Goulding.
Hardeman	Bolivar, 453 ft	35 18	12 00	45	59	49	50	74	21	18	16	n.			9	5	16									9	4.46	E. P. McNeal.
Hardin	Savannah, 400 ft	35 20	11 40	42	60	48	49	76	5	17	16	n.	h. 6.	21	12	8	10				11				1	9	4.22	H. R. Hinkle.
Humphreys	Waverly	36 00	10 45	42	60	57	54	76	10	10	16	nc.			10	11	9				5				1	7	3.03	D. R. Owen.
Lincoln	Howell	35 15	9 30	42	60	48	49	74	6	18	16	s.	h.		11	7	12				3					5	4.96	O. R. Hatcher, M. D.
Marion	Fostoria, 1,200 ft	35 10	8 50	40	59	46	48	69	30	14	16	n.			6		24											Charles Foster.
Montgomery	Sailor's Rest	36 24	10 35									nw.	br.	12	17	3	10				9				6	4.83	John Minor.
Overton	Hillham, 960 ft	36 22	8 26	42	57	46	48	75	23	12	16	sw.	br.		12	11	7		4	3	14	4			4	10	7.12	J. A. Laughlin.
Polk	Parksville, 900 ft	35 10	7 45	41	60	52	51	78	20	18	17	s.			15	5	10									6	5.96	Jno. C. Williamson.
Rutherford	Murfreesboro, 580 ft.	35 50	9 25	45	59	49	50	72	9	18	16	s.	br.	14	9	10	11				12	5	3		2	11	3.09	H. H. Clayton.
Rutherford	Florence Station	35 53	9 26	47	58	50	51	75	10	19	16	nw.	br.	11	12	7	11									10	3.11	C. F. Vandeford.
Rhea	Grand View, 1,635 ft	35 45	7 48	36	55	42	44	69	11	10	17	nw.	br.	27	11	9	10	1	10	4	11	2			1	4	5.9	Hattie R. Stratton.
Shelby	Memphis, 245 ft	35 07	13 07				54	77	21	20	16	se.	h.		14	9	7				11					10	4.56	D. T. Flannery.
Shelby	Woodstock	35 16	13 05	48	61	51	53	75	21	23	15	s.	h. 7.	21	14	7	6				8	2				10	2.72	C. W. Graves, 27 days.
Smith	Riddleton, 548 feet	36 19	9 07	43	51	49	47	82	11	17	16	nw.	h.	25	12	8	10		7		11				1	12	6.00	S. P. Fergusson.
Smith	Alexandria (near)	35 30	8 56					72		18	16	ij.	br.		7	5	11									3	1.66	I. Beckwith, 23 days.
Tipton	Covington	35 30	12 38	45	59	49	50	75	21	20	16	n.	h.	10 21	13	5	12				9		1		2	5	2.6	T. W. Roane, M. D.
Washington	Jonesboro	36 18	5 28	46	53	46	48	70	21	16	16	sw.	br.		13	4	13				9					7	2.18	Charles Mason.
Williamson	Franklin, 650 ft	35 50	9 48	43	56	47	48	74	10	16	16	s.	h.	21	13	2	15				12	2			1	10	2.86	Samuel Henderson.
Warren	McMinnville, 950 ft	35 45	8 45	44	54	48	48	76	9	17	16	s.	br.		11	7	12			1	10					7	3.20	R. M. Reams.

REPORT OF THE MISSOURI WEATHER SERVICE, NOVEMBER, 1883.

The mean temperature of November at Saint Louis has been 46°.7, which is 3°.8 above the average November temperature of the last forty-eight years, 3°.3 cooler than the warmest November, 1837, and 14°.6 warmer than the coolest November, 1880, of that period.

The highest mean temperatures reported from the stations were 50°.1 from Cairo, Illinois, 49°.5 from Louisiana, and 49°.1 from *Bolivar*. The lowest mean temperatures were 40°.4 at Kirksville, 40°.8 at Boonville, 41°.3 at Oregon, 41°.8 at Lexington, and 42°.8 at Keokuk, Iowa. The extreme temperatures observed during the month at Saint Louis were 15°.5 on the 16th and 72° on the 8th. The lowest temperature ever observed in Saint Louis during November was minus 0°.5, in the year 1845, and highest, 81°.5, 1837.

In the state the highest temperatures reported were 78° at Chamois and Sedalia, and 77° at Glasgow and Harrisonville. The lowest temperatures were 5° at Centreville, 7° at Boonville, 8° at Ironton, and 9° at Mexico and Sedalia. The extremes of temperature have, therefore, occurred in the central part of the state.

The rainfall at the central station was 2.18 inches, although the station at the water-works reports 3.57 inches. The normal rainfall at Saint Louis is 2.95 inches. In the state the rainfall has been greatest in the southeast quarter, the maximum, 6.8 inches, occurring at Ironton.

West of a line connecting the northeast and the southwest corners of the state the fall has been less than two inches, the average in this region being 1.75 inches. The least fall, 1.08, is reported from Oregon.

No snow has fallen during the month. The observer at Oregon remarks that the past November and that of 1865 are the only ones in twenty-five years in which no snow has fallen.

From the 23d to the 30th the sky, after sunset and before sunrise, has shown a remarkable glow of red, the phenomena being also widely observed over the whole country. The following observations are communicated from the stations:

Oregon.—The sky at sunset has been red, gradually fading to a bright light, similar to the zodiacal light, from the 23d to the 30th, inclusive. Sunrise has been accompanied with the same appearance. These phenomena disappeared usually at 18.45 in the evening, and appeared at 5.00 in the morning.

Lexington, 27th.—Red sunset sky. Illumination extends to zenith and beyond. 28th, remarkable red sunset.

Glasgow.—Sunset and sunrise have been accompanied by a remarkable redness, long preceding sunrise and following sunset. A great many people have spoken about it.

Centreville, 26th.—At 7.30 p. m. (19.30) the whole southern horizon shows a bright fiery crimson, the centre being apparently where the sun sets, extending from west to southeast. Is it an aurora in the wrong place, or the woods on fire? But the woods are too wet to burn!

Other stations report a red sunset without calling special attention to it.

On November 5th, at 14 hours, a tornado passed through Springfield, causing much destruction to property, and resulting in the death of four persons. The path had a length of about one mile, and width of one block. Severe local winds were reported at other points in the state the same afternoon. Some damage occurred four miles north of Marshfield. At Brookline a small tornado occurred. At Troy, at 18.30 o'clock, "the wind suddenly changed to northwest and blew a pefect gale for about twenty minutes, blowing off chimneys and smashing in windows. In the surrounding country fencing was blown down, trees blown up by the roots, and some out-buildings wrecked. Soon after dark a heavy cloud passed several miles west, bearing in its front a brilliant red light, which made objects in the streets distinctly visible, although nothing appears to have happened more than a havy rain when the cloud passed."

FRANCIS E. NIPHER, *Director.*

Washington University, *December* 10, 1883.

IOWA WEATHER BULLETIN FOR NOVEMBER, 1883.

November, 1883, was very clear and sunny, warm, and, in all but southeastern Iowa, quite dry; westerly and southeasterly winds were almost equally prominent.

The mean temperature of the air was one and a half degrees above normal. November is the first month since last April being above normal. The middle decade was coldest, nearly five degrees below normal; the first and last decades were almost as high above normal. The sun thermometer averaged forty degrees above the temperature of the air at noon. Plowing and tree planting possible till the close of the month.

The cloudiness was remarkably low: only once in thirty-four years was November as bright, namely: in 1865. The number of fine days was very great; warm and fine, Indian summer weather marking the first and last days of the month, and cold, clear weather prevailing during the middle decade.

The most notable storms occurred on the eighth and twenty-fifth. The first of these thunder-storms was more local, with very heavy hail at Iowa City; the second thunder-storm can be traced as a severe squall from Algona to Davenport, and was also quite severe in the northeast, causing everywhere a very sudden and great depression of the temperature. The high northwesterly winds of the 11th and 13th also lowered the temperature, the latter bringing the thermometer down to zero in the northwest of Iowa on the morning of the 15th.

During the foggy and rainy weather of the 20th and 21st, tornadoes

occurred in southeastern Missouri, while, during the extended rain and thunder-storm of the 5th, Springfield, in southwestern Missouri, was visited by a tornado. As stated before, Iowa has never been visited by a tornado in the months from November to March, inclusive.

The rainfall was very light in the entire western half of the state, and averaged about two inches for the eastern half, being greatest from Clinton over Johnson to Jefferson county, and east to the great river. The number of rain days was one to three in the west, and five in the east. No real snow storm has yet occurred this fall.

A bright, bursting meteor was seen at Ames on the 1st. The northern lights were bright on the 1st, less so, but more extendedly visible, on the 2d.

The most beautiful phenomena of the entire month were the varying and brilliant tints of sunset during the last five days of the month.

GUSTAVUS HINRICHS.

CENTRAL STATION, I. W. S., *December* 5, 1883.

The winter, now beginning, will probably be a moderate or mild winter for Iowa and the adjacent parts of the northwest. The observations of the past ten years make the above probability very high, and, taking into account the entire series of forty years' observations, the chances for this winter proving a severe one are less than one in twenty.

The following report has been forwarded by Mr. W. H. Ragan, director of the "Indiana Weather Service:"

The maximum temperature throughout the state was on the 9th; the minimum on the morning of the 16th. The warmest day in the northern sections was the 21st, in the southern, the 9th. The minimum temperature was reported from Tippecanoe county, the maximum from Switzerland county. The mean temperature for the state is 2.24 above the mean for November, as reported by the United States Signal Office at Indianapolis for a period of thirteen years.

The mean precipitation is 1.17 inches above the average for thirteen years at the Signal Office at Indianapolis, and 1.55 inches greater than the average of November for four years at Lafayette.

Snow, inappreciable, occurred on the 13th at Lafayette; also in Wayne, Fayette, and Johnson counties.

The following extract is taken from the report of the "Tennessee Weather Service" for November, 1883:

The mild temperature during the greater portion of the past month was very favorable for the maturity of the late crops, and for gathering those that were ready to be housed, and farmers generally took advantage of the opportunity presented, and, as a result, perhaps a larger proportion of these crops were gathered and housed, and marketed during the month, than for many years past. The cold weather of about the middle of the month checked, to some extent, the yield of some, but, taking it altogether, farmers have but little cause of complaint as to the conditions.